NPP/ VIIRS Level 2 Land Surface Temperature Product Description

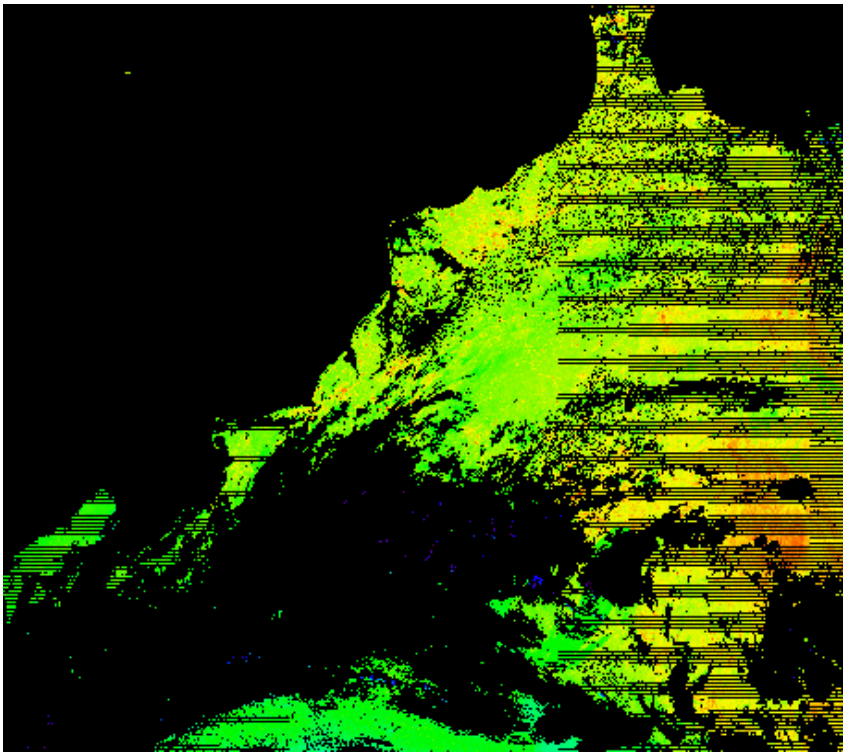
VIIRS Land Surface Temperature (LST) is retrieved at 750m resolution over all clear- sky land pixels, both during the day and at night. The VIIRS Cloud Mask product (VCM IP) is used to screen pixels for cloud contamination. LST is retrieved for pixels with heavy aerosol or thin cirrus contamination, but these pixels are flagged as degraded in quality.

The LST retrieval algorithm is a 2- band single- split window algorithm using bands M15 (10.8 um) and M16 (12 um). A separate set of LST retrieval coefficients has been derived for each of the 17 IGBP surface types, and the VIIRS Surface Type product is used to select the set of coefficients to be used in the split- window algorithm.

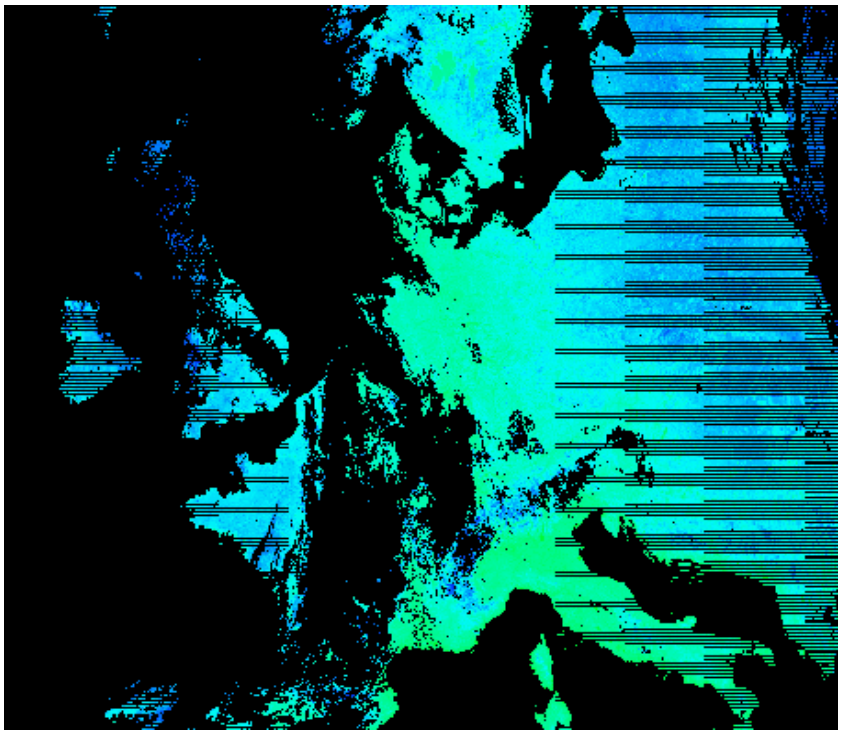
The Level 2 LST data product files (NPP_VLST_L2) consist of LST from every moderate- resolution clear, land pixel over an interval of approximately five minutes. Quality flags are included with the surface temperature data. See below for quality flag details.

Geolocation is not included in NPP_VLST_L2 files, but is available in the moderate- resolution SDR product (NPP_VMAE_L1) from the same time period. Moderate- resolution geolocation is also available as a separate product at Land PEATE (NPP_MOFT_L1) in AS3001.

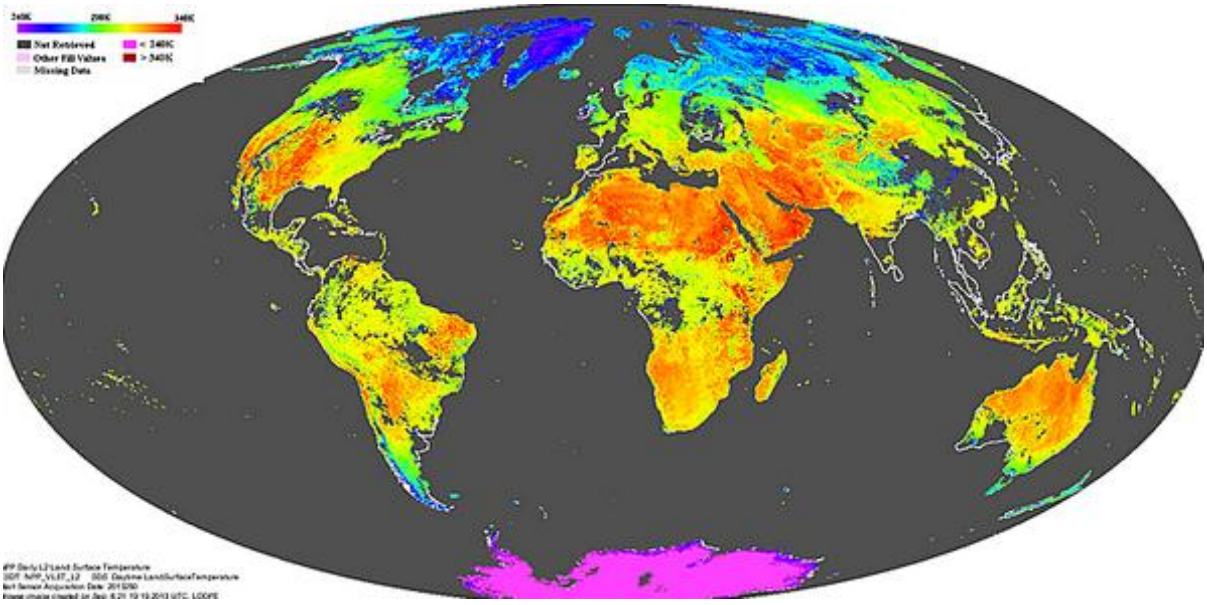
Sample product images



LST from granule 2013-250 18:05 (daytime)
Data from file NPP_VLST_L2.A2013250.1805.P1_03001.2013251093147.hdf



LST from granule 2013-250 01:35 (nighttime)
Data from file NPP_VLST_L2.A2013250.0135.P1_03001.2013250175519.hdf



Browse image generated by projection of all daytime LST granules from data day 2013250

File specification for NPP_VLST_L2

Dimensions:

Along_Track:LandSurfTemp_EDR
Along_Scan:LandSurfTemp_EDR

Variables:

short LandSurfaceTemperature(Along_Track:LandSurfTemp_EDR, Along_Scan:LandSurfTemp_EDR) ;

Scale = 0.0025455155f ;

Offset = 183.2f ;

Fill values: NA_UINT16_FILL = 65535
MISS_UINT16_FILL = 65534
ONBOARD_PT_UINT16_FILL = 65533
ONGROUND_PT_UINT16_FILL = 65532
ERR_UINT16_FILL = 65531
ELLIPSOID_UINT16_FILL = 65530,
VDNE_UINT16_FILL = 65529
SOUB_UINT16_FILL = 65528

byte QF1_VIIRSLSTEDR(Along_Track:LandSurfTemp_EDR, Along_Scan:LandSurfTemp_EDR)

Fill values: NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF2_VIIRSLSTEDR(Along_Track:LandSurfTemp_EDR, Along_Scan:LandSurfTemp_EDR)

Fill values: NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF3_VIIRSLSTEDR(Along_Track:LandSurfTemp_EDR, Along_Scan:LandSurfTemp_EDR) ;

Fill values: NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL =248

Quality flag details:

Byte 0		
Bits		
0-1	LST Quality	0 0 = High 0 1 = Medium 1 0 = Low 1 1 = No Retrieval
2	Algorithm	0 = 4-band dual-split window 1 = 2-band split-window
3	Day/ night	0 = Night 1 = Day (0° ≤ Solar zenith angle ≤ 85°)
4	SWIR Brightness Temperature availability	0 = Both available 1 = At least one not available
5	LWIR Brightness Temperature availability	0 = Both available 1 = At least one not available
6	Active Fire	0 = No active fire 1 = Active fire
7	Exclusion- Thin cirrus	0 = No thin cirrus 1 = Thin cirrus
Byte 1		
Bits		
0	Clear Measurement Precision Degradation	0 = No degradation 1 = Degradation
1	Retrieved LST out of expected reporting range	0 = Within range, (213 K ≤ LST ≤ 343 K) 1 = Out of range
2 - 3	Cloud Confidence Indicator	0 0 = Confidently Clear 0 1 = Probably Clear 1 0 = Probably Cloudy 1 1 = Confidently Cloudy

4	AOT Condition	0 = Within range, (AOT ≤ 1.0) 1 = Outside range
5	Horizontal Reporting Interval	0 = Within Horizontal Cell Size, Nadir to 1.3 km (0° ≤ Sensor Zenith Angle ≤ 53°) 1 = Out of range
6	Sun Glint	0 = None 1 = Present
7	Terminator	0 = Beyond Terminator 1 = Inside Terminator, (85° < Solar Zenith Angle ≤ 100°)
Byte 2		
Bits		
0-2	Land/Water Background	0 0 0 = Land and Desert 0 0 1 = Land / No Desert 0 1 0 = Inland Water 0 1 1 = Sea Water 1 0 1 = Coastal
3- 7	Surface Type	00001 = Evergreen Needleleaf Forests 00010 = Evergreen Broadleaf Forests 00011 = Deciduous Needleleaf Forests 00100 = Deciduous Broadleaf Forests 00101 = Mixed Forests 00110 = Closed Shrublands 00111 = Open Shrublands 01000 = Woody Savannahs 01001 = Savannahs 01010 = Grasslands 01011 = Permanent Wetlands 01100 = Croplands 01101 = Urban Built-Up 01110 = Croplands/Natural Vegetation Mosiacs 01111 = Snow Ice 10000 = Barren 10001 = Water Bodies 11111 = Invalid IGBP Surface Type